Risk Assessment Form

**Work Activity:** Flooding Emergency Procedure

**Client:** Day Associates

**Site:** 7 Bevan Close, Finedown Industrial Estate, Wellingborough, NN8 4BL

**R.A. No.:** 001/02

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## FLOOD RISK ASSESSMENT

### Project Background:
Lucas Walsh have been appointed to prepare a site specific Flood Risk Assessment to support the planning application due to be reviewed on 2nd November 2015.
The Flood Risk Assessment (FRA) with cover:
- Sources of flooding likely to affect the site
- Potential measures that could be incorporated to reduce the risk to acceptable levels

### Proposed Development:
The development proposals comprise of 2 x commercial storage units made of concrete, steel and aluminum cladding. There sizes are 1 at 45m x 34 m and 1 at 37 m x 34m

### Consultation:
We have consulted with the following authorities

**Environment Agency (EA)**
They have provided us with a flood map for the area, Fluvial flood levels for the River Ise, local flood defence information and a summary of details of flood events in the area. This information was extracted from the Nene Strategic Model Middle Nene (August 2012) the most up to date information available.

**Northamptonshire County Council (NCC)**
The flood and water management team at NCC provided information relating to historic local flooding, assts relating to flood risk, the local flood risk management strategy and general drainage advice.

### Other references
Reference has been made to the following documents on the Wellingborough Council website:
- Kettering and Wellingborough Strategic Flood Risk Assessment Update (February 2011)
- North Northamptonshire Flood Risk Management Study Update (March 2012)

### Assessment Methodology
The assessment has been conducted in accordance with the National Planning Policy Framework (NPPF). The NPPF and its supporting Planning Practice Guidance 'Flood Risk and Coastal Change' replaced the previous guidance document Planning Policy Statement (PPS) 25 and provides guidance on how new developments must take into account flood risk, including making allowance for climate change impacts.

NPPF maintains the same principles as PPS25, encouraging decision makers to:
FLOOD RISK ASSESSMENT

- Steer new developments to lower risk locations that are appropriate to the proposed use and ensure development is safe
- Prevent any increase in flood risk elsewhere and reduce flood risk through the layout and form of the development and the appropriate application of sustainable systems
- Reduce flood risk by making space for water by creating flood flow paths and by identifying, allocating and safeguarding space for flood storage
- Use regeneration to help relocate development to lower risk locations when climate change is expected to mean to some existing development may not be sustainable in the long-term.

The methodology adopted in this FRA comprises:
- Review of available flood risk data to identify existing flood risk from fluvial, tidal, groundwater, overland flow and artificial sources:
- Consideration of existing ground conditions on the site to determine potential groundwater levels, soil permeability and contamination risk through a review of previous land use and information available from the EA, the British Geological Survey (BGS) and National Soil Resources Institute (NRSI) Soils Site Report.
- Review of the development proposals in terms of flood risk vulnerability and flood zone compatibility, in accordance with the methodology defined in the NPPF.
- Consideration of how the development proposals may affect flood risk to the site and surrounding land.
- Proposals for the appropriate management of flood risks to facilitate development whilst not increasing risk elsewhere.

Data regarding flood risk relevant to the proposed development and surrounding area has been obtained from the following sources:
- EA indicative flood risk maps and groundwater maps
- Strategic Flood Risk Assessments and Flood Risk Management studies available on the Borough Council of Wellingborough website.

Definition of flood risk
Flood risk is the product of likelihood or chance of flooding occurring (flood frequency) and the consequence or impact of the flooding (flood consequence).

Flood frequency is identified in terms of the return period or annual probability. For example, a 1in 100 year flood event has a 1% annual probability of occurring. Table 1 below provides a conversion between return periods ad annual flood probabilities.

Table 1: Flood Probability Conversion Table

<table>
<thead>
<tr>
<th>Return Period (Years)</th>
<th>2</th>
<th>5</th>
<th>10</th>
<th>20</th>
<th>50</th>
<th>100</th>
<th>200</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Flood Probability (%)</td>
<td>50</td>
<td>20</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>0.5</td>
<td>0.1</td>
</tr>
</tbody>
</table>

The NPPF identifies Flood Zones in relation to flood frequency. The zones refer to the probability of river (fluvial) and sea (tidal) flooding, whilst ignoring the presence of defences. Table 2 below
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FLOOD RISK ASSESSMENT

summarises the relationship between Flood Zone category and the identified flood risk.

Table 2: Flood Zones

<table>
<thead>
<tr>
<th>Flood Risk Area</th>
<th>Identification</th>
<th>Annual Probability of Fluvial Flooding</th>
<th>Annual Probability of Tidal Flooding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td>Low Probability</td>
<td>&lt;0.1%</td>
<td>&lt;0.1%</td>
</tr>
<tr>
<td>Zone 2</td>
<td>Medium Probility</td>
<td>1% - 0.1%</td>
<td>0.5% - 0.1%</td>
</tr>
<tr>
<td>Zone 3a</td>
<td>High Probability</td>
<td>&gt;1%</td>
<td>&gt;0.5%</td>
</tr>
<tr>
<td>Zone 3b</td>
<td>Function Flood Plain</td>
<td>&gt;5%</td>
<td>&gt;5%</td>
</tr>
</tbody>
</table>

Flood consequences

The consequences of a flood event describes the potential damage, danger and disruption caused by flooding. The is dependent on the mechanism and characteristics of the flood event and the vulnerability of the affected land and land use.

The identified five classifications on the compatibility of each vulnerability classification with Flood Zones, as shown in Table 3.

The proposed development will comprise of general industry/minerals working and processing, and will fall into the flood risk vulnerability classification of 'Less Vulnerable' development.

Table 3: Flood Risk Vulnerability and Flood Zone Compatibility

<table>
<thead>
<tr>
<th>EA Flood Zone</th>
<th>Essential Infrastructure</th>
<th>Water Compatible</th>
<th>Highly Vulnerable</th>
<th>More Vulnerable</th>
<th>Less Vulnerable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Zone 2</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Zone 3a</td>
<td>✓ Exception test required</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zone 3b</td>
<td>✓ Exception test required</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

✓ Development considered acceptable
x Development considered unacceptable

Potential Sources of Flooding

In accordance with the NPPF, the following sources of flooding will be considered in this
FLOOD RISK ASSESSMENT

- Fluvial flood risk from nearby watercourse
- Tidal Flooding
- Overland surface water flooding from adjacent sites
- Site generated surface water runoff
- Surcharging of sewers
- Groundwater flooding

Potential Effects of Climate Change

Scientific consensus is that the global climate is changing as a result of human activity. While there remain uncertainties in how a changing climate will affect areas already vulnerable to flooding, it is expected to increase risk significantly over time. For the UK projection of future climate change indicates that more frequent short-duration high-intensity rainfall events and more frequent periods of long duration rainfall could be expected.

Planning Practice Guidance ‘Flood Risk and Coastal Change’ provides recommended national precautionary sensitivity ranges for possible peak rainfall intensities resulting from climate change for the next 100 years, shown in Table 4.

**Table 4: Recommended National Precautionary Sensitivity Ranges for Peak Rainfall Intensities and Peak River Flow**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>1990 to 2025</th>
<th>2025 to 2055</th>
<th>2055 to 2085</th>
<th>2085 to 2115</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Rainfall intensity</td>
<td>+5%</td>
<td>+10%</td>
<td>+20%</td>
<td>+30%</td>
</tr>
<tr>
<td>Peak River flow</td>
<td>+10%</td>
<td></td>
<td>+20%</td>
<td></td>
</tr>
</tbody>
</table>
## Flood Risk Assessment

### The Flood and Water Management Act 2010

The Flood and Water Management Act 2010 (FWMA) introduces new responsibilities for flood risk management for local authorities and sets out new requirements for the management of sustainable drainage.

The FWMA is still being implemented and this report will provide guidance on how its implementation will impact on the management of surface water and flood risk for the proposed development.

### Lead Local Flood Authorities

Under the FWMA the unitary or county council for an area is designated the ‘Lead Local Flood Authority’ (LLFA) with responsibility for managing flood risk from surface water, groundwater and ordinary watercourses within their area. LLFA is also the consenting authority for any works in connection with ordinary watercourses. The LLFA for this location is Northamptonshire County Council.

### Sustainable Drainage

Schedule 3 of the FWMA introduces new National Standards for Sustainable Drainage Systems (SUDS) against which proposed drainage systems should comply. Under schedule 3 of the FWMA, LLFAs will become SUDS Approving Body (SAB) for surface water drainage systems for new development. Approval from the SAB for drainage proposals must be agreed prior to construction. For drainage systems that serve more than one property, the SAB will have responsibility for maintenance of adopted SUDS schemes that meet the SAB requirement. These standards are currently in draft.

The draft standards introduce the SUDS hierarchy that requires the following methods of surface water disposal to be considered in order of preference:

- Discharge into ground
- Discharge into a surface water body
- Discharge to a surface water sewer
- Discharge to a combined sewer

The draft standards also promote the management of surface water runoff at source, on the surface and integrated with public open space where it is reasonably practicable to do so.

### Agreements on new drainage systems

Under Section 106 of the Water Industry Act 1991, owners of premises and sewers have the right to connect to the public sewer network to discharge foul and surface flows. The sewerage undertaker has the right to refuse to permit new connections to be made if the mode of construction or condition of the connection does not satisfy the standards reasonably require by the undertaker, or if the making of the connection would be prejudicial to the undertaker's...
FLOOD RISK ASSESSMENT

sewerage connection,

Section 42 of the FWMA inserts a new Section into the Water Industry Act 1991, adding two conditions to the right to connect. The first condition is that the person constructing the connection has entered into an adoption agreement between the owner of the connection and the sewerage undertaker under Section 104 of the Water Industry Act 1991. The second condition is that the agreement must include provision about the standards to which the sewer must be constructed, and about the adoption of the drain or sewer by the undertaker.

Review of Relevant Planning Policy

Borough Council of Wellingborough Local Plan 2007

The Local Plan included the following policies related to flooding and the water environment:

Policy G2 – Flood Protection, States that unless suitable flood protection and mitigation measures appropriate to compensate for the impact of the development are provided, planning permission will be refused for development.
- Within the floodplains as shown on the proposal map
- In other areas at risk of flooding
- Which will increase the risk of flooding elsewhere
- Result in problems due to additional surface water runoff

Site Location:

Currently building a power station – we are planning to build two storage buildings for the power supply. Both buildings will be made of concrete, steel and aluminium cladding. Building
FLOOD RISK ASSESSMENT

one 45m x 34 m and Building 2 37m x 34m

The existing site is largely un-surfaced and drains through infiltration into the ground. There are no drainage ditches or serves present on our part of the existing site.

ASSESSMENT OF EXISTING FLOOD RISK

Historical Flooding
A copy of the Historic Flood Extent Map is shown in Appendix X. This shows the extent of the previous recorded flooding in the vicinity of the proposed development. The most notable flood events in the area are March 1947 and Easter 1998.

The map indicates that the flooding of the northern part of the site resulted in March 1947 flood event and that the southern end of the site, which will form the vehicular access into the site, was flooded adjacent to the Swanspool Brook.
The Easter 1998 flood event was associated with fluvial flooding on the River Ise. Flooding occurred on the east bank of the River Ise but did not affect the proposed development site on the west bank.

Localised flooding was also recorded in 2006 at Stanton Close, approximately 500m to the west of the proposed site. It is believed that this flooding resulted due to a blockage in the channel of Swanspool Brook.

Fluvial Flood Risk

The EA Flood Map for Planning for the proposed development site is shown in Figure 2 below and included in Appendix B. The Flood map indicates that the proposed development site is located partly in the Flood Zone 1 and partly in Flood Zone 2.
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The northern end of the site, and a small area in the south-east corner of the site near to Swanspool Brook, lies Flood Zone 2, a medium risk flood area. These areas comprise land assessed as having between a 1 in 100 and a 1 in 1000 annual probability of river flooding in any year (1%-0.1%). The remainder of the site is in Flood Zone 1, a low risk flood area, with less than a 1 in 1000 annual probability of river flooding in any year (<0.1%).

There are no formal flood defences protecting the proposed site. The River Ise is classified as 'Main River' at the location of the site and is maintained by the EA. The River Ise channel provides a negligible protection against a flood event with a 1 in 2 year (50%) chance of occurring in any year. Swanspool Brook is also classified as 'Main River' and maintained by the EA.

The EA have provided fluvial flood levels for the River Ise at this location taken from the Nene Strategic Model Middle Nene (August 2012). These are the most up-to-date available flood levels. The flood levels are presented in the table below. The node labels represent the reference points shown in Figure 2.

Table 4: Fluvial Flood Levels for the River Ise

<table>
<thead>
<tr>
<th>Node Label</th>
<th>Easting</th>
<th>Northing</th>
<th>5% (1 in 20)</th>
<th>1% (1 in 100)</th>
<th>1% (1 in 100) Incl climate change</th>
<th>0.1% (1 in 1000)</th>
<th>0.1% (1 in 1000) Including climate change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISE 3923</td>
<td>490054</td>
<td>270326</td>
<td>45.16</td>
<td>45.27</td>
<td>45.36</td>
<td>45.51</td>
<td>45.56</td>
</tr>
<tr>
<td>ISE3694</td>
<td>490170</td>
<td>270192</td>
<td>44.77</td>
<td>44.89</td>
<td>44.98</td>
<td>45.12</td>
<td>45.18</td>
</tr>
<tr>
<td>ISE3578</td>
<td>490269</td>
<td>270113</td>
<td>44.61</td>
<td>44.73</td>
<td>44.82</td>
<td>44.96</td>
<td>45.04</td>
</tr>
<tr>
<td>ISE3520</td>
<td>490314</td>
<td>270064</td>
<td>44.54</td>
<td>44.65</td>
<td>44.74</td>
<td>44.89</td>
<td>44.96</td>
</tr>
<tr>
<td>ISE3387</td>
<td>490384</td>
<td>269981</td>
<td>44.43</td>
<td>44.43</td>
<td>44.52</td>
<td>44.71</td>
<td>44.81</td>
</tr>
<tr>
<td>ISE3252</td>
<td>490459</td>
<td>269844</td>
<td>44.23</td>
<td>44.38</td>
<td>44.48</td>
<td>44.67</td>
<td>44.78</td>
</tr>
<tr>
<td>ISE3126</td>
<td>490612</td>
<td>269815</td>
<td>44.2</td>
<td>44.34</td>
<td>44.44</td>
<td>44.63</td>
<td>44.73</td>
</tr>
</tbody>
</table>

Existing site levels are generally between 45m and 50m AOD. In comparison with the above fluvial flood levels, the majority of the site is situated above the predicted maximum water levels.

Tidal Flooding
The site is not located near the coastal or tidal waters and is not a risk from tidal.

Flooding from Overland Surface Water from Adjacent Sites
There are no known incidences of overland surface water flooding in this area. Overland surface runoff from the fields to the east would be intercepted by the River Ise.

Flooding from reservoirs
The EA Risk of Flooding from Reservoirs Map is shown in Figure 3 below and indicates that the Ise Valley is potentially at risk from flooding from three reservoirs – Thorpe Malson, Cransley.
FLOOD RISK ASSESSMENT

Reservoirs, located to the west of Kettering and Wickshead Park Lake located in the South-East of Kettering.

Figure 3: Environment Agency Risk of Flooding from Reservoirs Map

Flooding from Site-generated Surface Water Runoff

Where paved surfaces are constructed, these will be laid to falls to drainage channels and new surface water drainage system. New drainage will be designed in accordance with current design standards an recommendations. As a general rule, these require that new drainage is designed so as not to flood out of the drainage system for up to 30 ear rainfall events. For rainfall event that exceed this, where flooding out of the drainage system results, measures are usually required to ensure that runoff is channeled away from the people and property, to low risk areas on the site such as the Brook.

Main Hazards whilst carrying out construction work: (What could cause harm?)

High water levels (Electrocution, Drowning, Fire, Contact with contaminated water)

Persons Exposed to Risk: (Who could be harmed and how badly?)
### Risk Assessment Form

**FLOOD RISK ASSESSMENT**

Employees  
Visitors  
Emergency Services

<table>
<thead>
<tr>
<th>Assessment of Risk: (see Table Below)</th>
<th>Level of Risk</th>
<th>Likelihood</th>
<th>Risk</th>
<th>M/L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Control Measures Required:**

**Electrics:**
- New electrical fittings (plug sockets, outlets) must be fixed above estimated maximum flood level plain.
- **Cables for temporary electrics must be strung above estimated maximum flood level plain.**
- Cable management plan to be displayed.
- In the event of a flood/severe weather warning all electrical appliances must be isolated and raised above flood level plain.
- In the event of a flood/severe weather warning all staff and visitors must vacate the building in accordance with the Emergency Evacuation Plan.
  - In the event of contact with contaminated water:
    > Wash hands immediately
    > Do not eat or drink
    > If swallowed seek medical advice

**PPE:** Tack as required
- Safety helmets
- Hi-Vis Jackets
- Safety footwear
- Eye protection
- Dust masks
- Ear plugs
- Ear muffs
- Gloves
- Protective overalls
- Gauntlets
- Harnesses
- Breathing apparatus

**Prepared By:** Lisa Hall  
**Date:** 1st October 2015  
**Received/Reviewed at:** Site Manager  
**Date:**

**Key:**
- **H** – High  
- **M** – Medium  
- **L** – Low  
- **Red:** Do not proceed – risk must be reduced to a lower level  
- **Amber:** Proceed only if specific controls will not allow the risk to increase  
- **Green:** Risk controlled effectively. Proceed with operation and monitor for changes